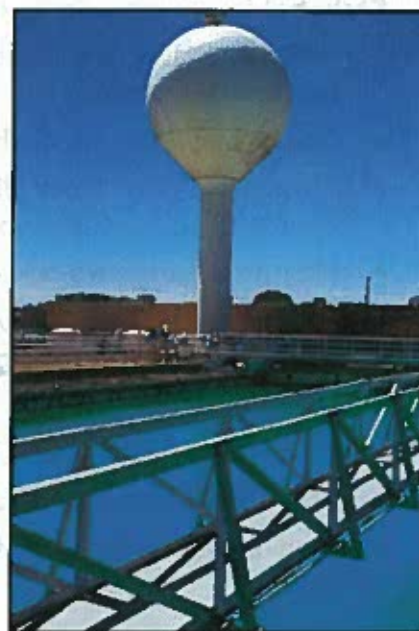




# 5

Utilities convey some of the services essential to contemporary life, especially water and power. They have shaped development historically in important ways, because their infrastructure—power lines and generators, water and sewer lines, treatment plants, and reservoirs—is extremely intensive. Creating and modifying this infrastructure is costly to do, both financially and physically. The utilities that have shaped, and continue to shape, Oak Hill the most are water and wastewater systems.

This chapter briefly explains the history of how centralized utility services were extended throughout Oak Hill. The chapter also reviews City programs and regulations that address erosion and stormwater. Understanding the history of Oak Hill's infrastructure planning, including City water and wastewater services, contributes to sound land use planning processes. The information in this chapter supports the long-term land use and transportation recommendations in chapters 6 and 7.



**Figure 5-1: The Thomas C. Green Water Treatment Plant opened in 1925**

## CENTRAL WATER AND WASTEWATER SERVICES

The Austin Water Utility supplies water to water supply corporations, municipal utility districts, private utilities, and individual customers within and outside of Austin's city limits. Water is drawn from the Colorado River (Lake Austin and Town Lake) and purified at three water treatment plants.

The Austin Water Utility serves approximately the same area for drinking water as it does for wastewater collection. Austin Water Utility's service area is shown on the map in Figure 5-2. This boundary includes areas that the Austin Water Utility currently serves and the areas into which it plans to extend service. Figure 5-3 shows the current connection points for water and wastewater. The Austin Water Utility does not currently provide wastewater service to most areas of southwestern Oak Hill that fall outside Austin's full purpose city limits.

The availability of municipal water and wastewater systems helps to shape land development patterns. Certain engineering and design limitations on development density are removed once residential subdivisions and commercial sites



### **Stakeholder comments and concerns that influenced the content of this chapter**

- Address existing and future untreated runoff from the U.S. Highway 290 and William Cannon intersection.
- Create additional regional retention ponds that increase the base flow of creeks.
- Augment flow to "Lake Midwood" (local name for wet pond east of Midwood Road) to ensure it continuously supplies water to creeks and recharge features.
- Mitigate the negative consequences of older structures located in the floodplain.
- Enforce the codes for floodplains and streams.
- Provide more structural runoff controls; there is too much water diverted away from the aquifer.
- Provide fire hydrants on Old Bee Caves Road.
- Address the abandoned sewage treatment plant on Silvermine and Fletcher.
- Provide utilities for Oak Hill residents west of the "Y" that do not currently have utility service.

are no longer forced to rely only on well water and decentralized wastewater systems (usually septic tanks). Property values typically rise when centralized utility service becomes available. As a result, the extension of water lines and service is often controversial, especially in environmentally sensitive areas.

## **WATER SERVICE**

### **Dependence on Well Water**

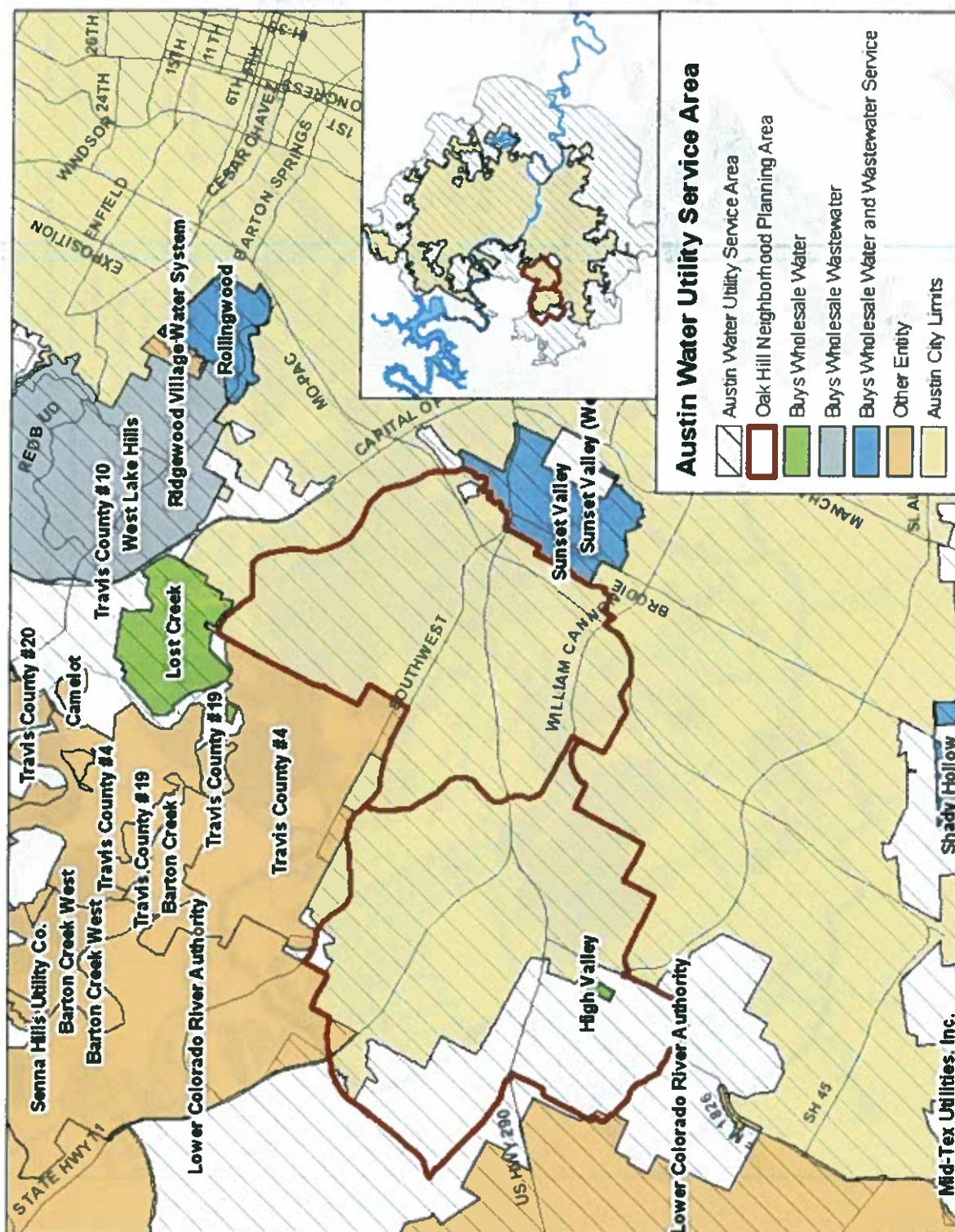
Until the middle of the twentieth century, Oak Hill residents and businesses relied on wells

### **Barton Springs/Edwards Aquifer Conservation District (BS/EACD)**

The BS/EACD was created in 1987 by the State Legislature, with the support of voters, to "conserve, protect and enhance the groundwater resources of the Barton Springs segment of the aquifer." The BS/EACD regulates well usage through conservation and drought planning and regulation of well construction within its boundaries. It requires all non-exempt well owners to develop User Conservation Plans; the BS/EACD states that these Plans, "when followed, will maximize the utility of water withdrawn from the aquifer." Non-exempt well owners are also required to develop a User Conservation Plan which should dictate conservation pumping levels during times of drought in the District. The BS/EACD maintains a list of non-compliant permittees which can be viewed at <http://www.bseacd.org/regulatory.html>. These well owners are pumping illegal quantities of water during times of drought; Tier C permittees are pumping over 100% their share of underground water.



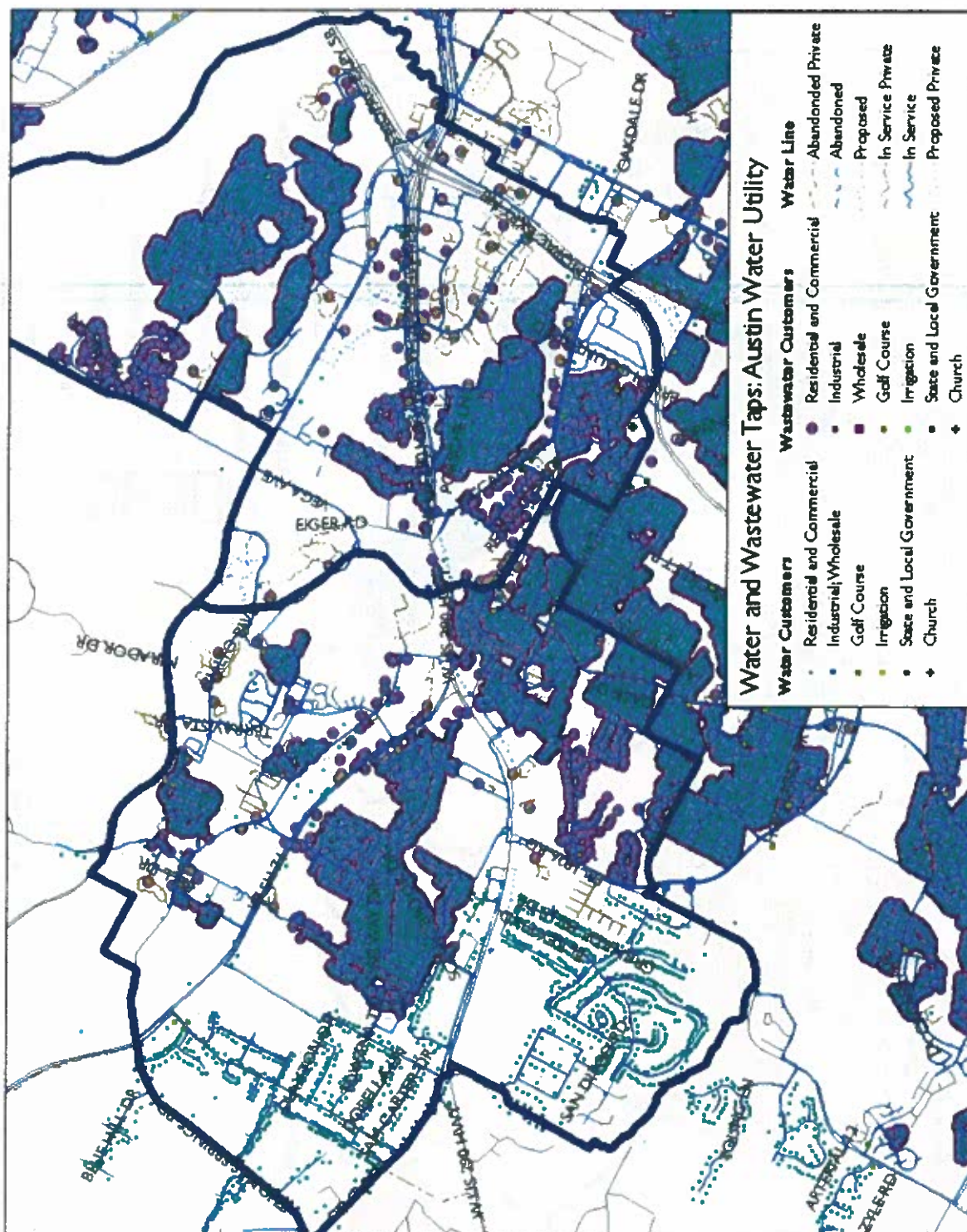
**Figure 5-2: Austin Water Utility Service Area**







**Figure 5-3: Water and Wastewater Taps: Austin Water Utility**





for drinking water. Wells in eastern Oak Hill draw water from the Edwards Aquifer and are regulated by the Barton Springs/Edwards Aquifer Conservation District (BS/EACD, see page 48). Edwards Aquifer wells generally offer clean water with consistent yields and are called “firm yield” wells. New wells permitted for the western portions of the aquifer (the east Oak Hill area), however, are considered interruptible or “conditional yield” wells. Unlike firm yield wells, interruptible wells do not promise a steady water supply. In times of drought, well pumpage may be significantly reduced.

Wells in western Oak Hill may draw water from the Trinity Aquifer, not the Edwards Aquifer. Trinity well water is generally considered lower in quality and yield than Edwards well water. The Circle C golf course is irrigated with water drawn from a Trinity Aquifer well. Before the use of a centralized municipal water supply, development in Western Oak Hill was limited by the constraints of Trinity aquifer wells

### **Water Line Extensions to Southwest Austin**

Figure 5-2 shows the Austin Water Utility’s service area. The service area has been expanded over time as the City annexes land and state and local laws evolve. The planning area is located within the Austin Water Utility’s service area.

Oak Hill contains one of the City’s Certificates of Convenience and Necessity (CCNs) for water. Utilities in Texas, like the Austin Water Utility, register for CCNs with the Texas Commission on Environmental Quality (TCEQ). Austin’s CCNs and Austin’s CCN areas protect a service area from the encroachment of other utility providers; constructing infrastructure that supports water or wastewater services is costly, and CCNs ensure utilities they will have the potential customer base to recoup their initial investments. In exchange for this protected customer base, utilities with CCNs are required by TCEQ to provide service to that area, in accordance with service extension plans. The Austin Water Utility is required by law to provide water service within its water CCN boundaries or allow another provider to serve part of the area.

The CCN area within Oak Hill is the City of Austin’s only CCN within its Drinking Water Protection Zone (see Figure 5-4). This area used to belong to Water Control and Improvement District (WCID) #14, a Travis County water provider using City of Austin water, which was acquired by the Austin Water Utility. WCID #14 was created in 1958 and probably distributed water to customers from one large Trinity aquifer well.

When WCID #14 was acquired by the City, its infrastructure became the property of the Austin Water Utility, and all of its existing and potential customers became Austin Water Utility customers. At that time, the Austin Water Utility assumed the responsibility to extend water service to any customers requesting water service within WCID #14’s old boundaries (Figure 5-5).

Water service in other areas of Oak Hill was provided as a result of annexation. Annexation is one mechanism by which cities expand tax bases and regulate development. The City annexed the “Upper Williamson Creek” area in 1985 and created a service extension plan for the area.

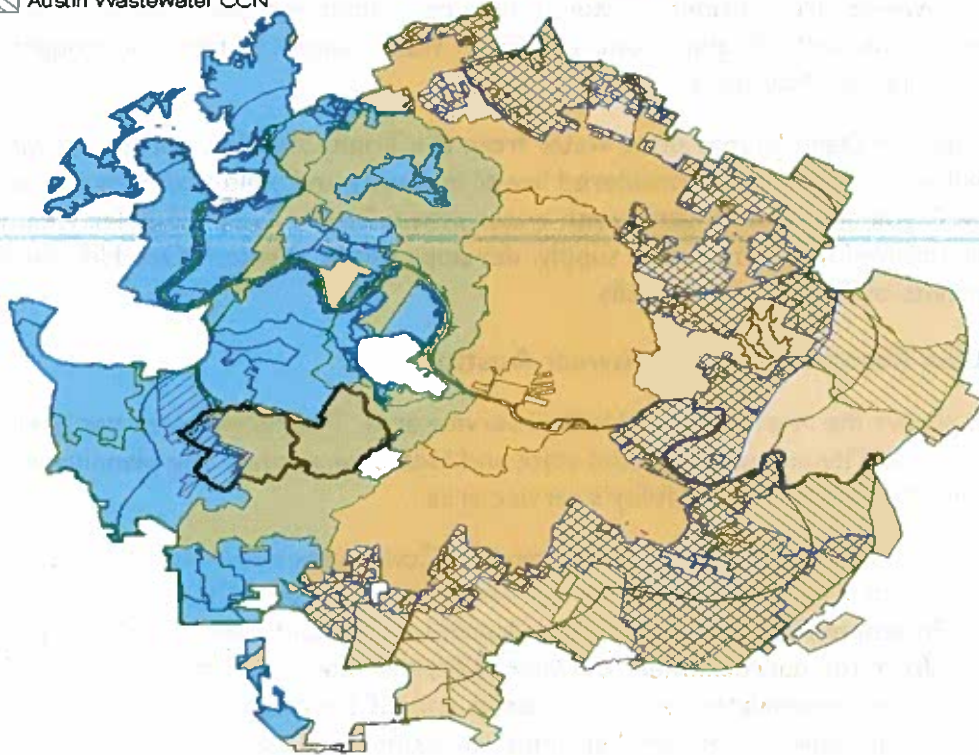




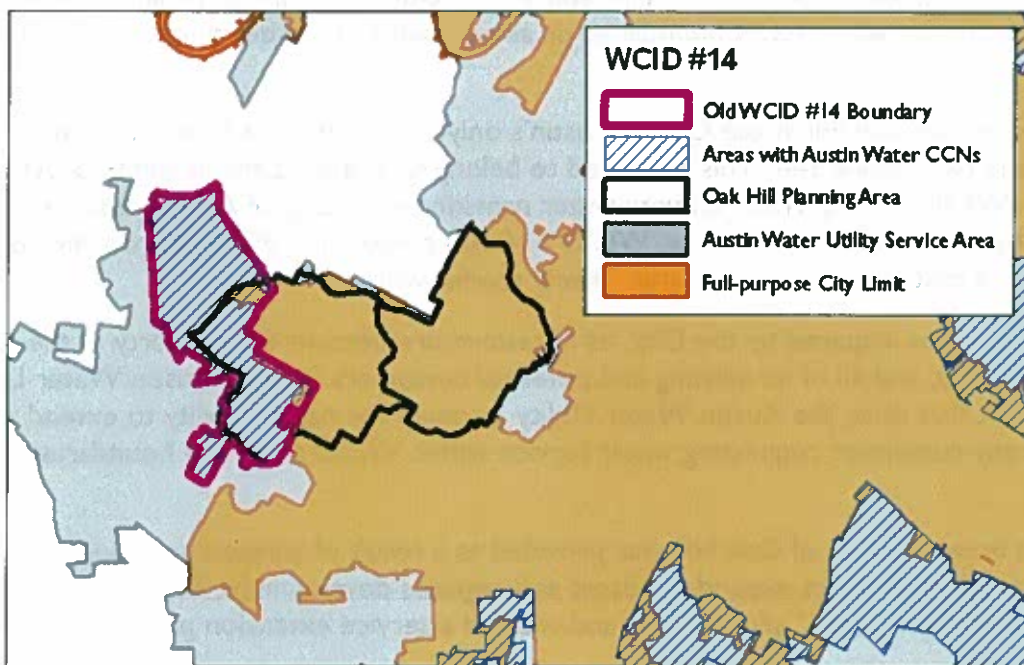
**Figure 5-4**

**Oak Hill in Relation to Austin's CCNs**

- |   |   |  |
|---|---|--|
|  Service Area Boundary |  Full-purpose City Limit |  Desired Development Zone       |
|  Austin Water CCN      |  Oak Hill Planning Area  |  Drinking Water Protection Zone |
|  Austin Wastewater CCN |   |  |



**Figure 5-5: WCID #14**





## Chapter 5: PUBLIC UTILITIES AND DEVELOPMENT PATTERNS

The plan included full water and wastewater services and fire services, which created a need for increased water line capacity. New lines and water tanks were constructed in 1986.

The City constructed new water lines for other areas of Oak Hill as they were annexed. The City became responsible for providing emergency fire services. The existing small lines, which belonged to rural water districts, were abandoned.

### **Service Extension Requests within the Austin Water Utility's Service Area**

All of the planning area is in the Austin Water Utility Service Area, though not all of the planning area receives service. The Austin Water Utility extends water and wastewater service in accordance with City service extension policies and ordinances. The City has additional legal obligations within the service area boundary for the portion that is covered by its water CCN.

Within the Austin Water Utility Service Area, Service Extension Requests (SERs) made by applicants are approved administratively by the Director unless a property is outside the City limits and within the Drinking Water Protection Zone or if the project will require the City to Cost Participate (usually to oversize proposed service extension request water or wastewater lines to provide additional capacity for future Utility needs).

Water and Wastewater lines are extended by Service Extension Requests applied for by applicants to meet their project needs while following City criteria and utility planning goals, such as providing reliable water service. An example of providing reliable water service is "looping" water lines—where a tap receives water from two directions—makes that tap's water supply less vulnerable to failure (since both directions must fail for the tap to be cut off from water). The utility's goals and extension plans are outlined in the Austin Water Utility Strategic Water Resources Plan (most recently updated in November 2003), which shows that the Utility is planning to provide water and wastewater services to the parts of the Oak Hill area that does not yet receive them.

If an SER is made for a property that is outside the City limits and within the Drinking Water Protection Zone, then it will also be reviewed by WPDRD staff. WPDRD staff considers the following criteria when they review these SERs:

1. Will future development be required to comply with current code?
2. Does the requested service result in more intense development than would be possible absent the service?
3. If so, is the development in an area in which we are encouraging development?
4. Does the service provide for additional development other than the requesting tract?
5. Would central service solve known or potential environmental problems?
6. Is serving the area consistent with long-term service area and annexation goals?

WPDRD forwards their recommendation for each proposed SER to the Environmental Board which makes their assessment. The Austin Water Utility takes the proposed SER to the Wa-





### Austin Water Utility Cost Participation

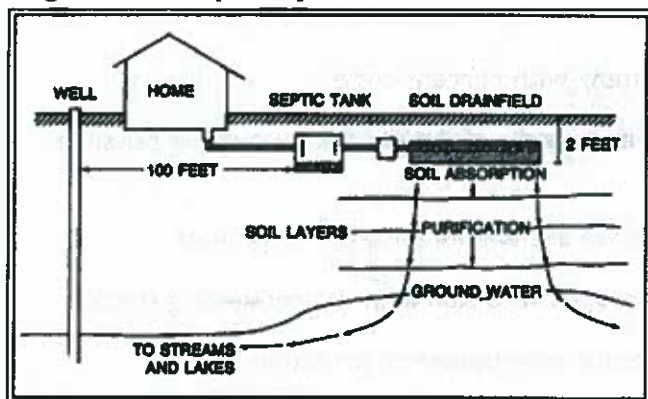
The Austin Water Utility occasionally “cost participates” with private developers to install oversized water or wastewater lines in particular areas. During SER Review when utility staff anticipates there will be additional development in that immediate area which will require additional water or wastewater capacity, the utility will provide cost participation to construct oversized water or wastewater lines large enough to provide future anticipated capacity. This oversizing refers to requiring larger diameter lines than the standard diameter line that would specifically be required for the applicant’s project.

ter and Wastewater Commission, which also provides their assessment. The Utility then submits the proposed SER and both assessments to City Council. City Council makes the final decision on whether to approve these types of SERs.

### The Extension of Centralized Wastewater Service

Development intensity is also limited by wastewater service. Until the 1970s, the absence of access to centralized wastewater maintained Oak Hill’s rural, low density character. Decentralized service in Oak Hill commonly takes the form of septic tanks and drainfields (Figure 5-6). Sewage reaches the septic tank where solids and liquids separate and begin to break down. Liquid waste or effluent then drains out from the tank to the drainfield to be treated or purified by surrounding soil. Functioning soil drainfields require a significant amount of space. Austin residents using septic tanks with access to centralized water must have lots at least one half acre in size (21,780 square feet); those using water from on-site wells are required to have lots of at least one acre (43,560 square feet). By contrast, the minimum lot size required for residences with full water and wastewater service is 5,750 square feet with property in the SF-2 Single Family Residence Standard Lot or SF-3 Single Family Residence zoning categories.

**Figure 5-6: Septic System**



Buncombe County Soil and Water Conservation Department image, [http://www.buncombecounty.org/Living/news\\_Detail.asp?newsID=1767](http://www.buncombecounty.org/Living/news_Detail.asp?newsID=1767)

Oak Hill is located at the outer reaches of the City’s centralized wastewater service area. The “Water and Wastewater Taps” map (Figure 5-3) shows that most residences and businesses in eastern Oak Hill are connected to city water and wastewater service. Some homes in western Oak Hill do not connect to the city’s central sewer system.

In the early 1970s, prior to the adoption of the watershed-based development regulations discussed in Chapter 4, Oak Hill’s de-





## Chapter 5: PUBLIC UTILITIES AND DEVELOPMENT PATTERNS

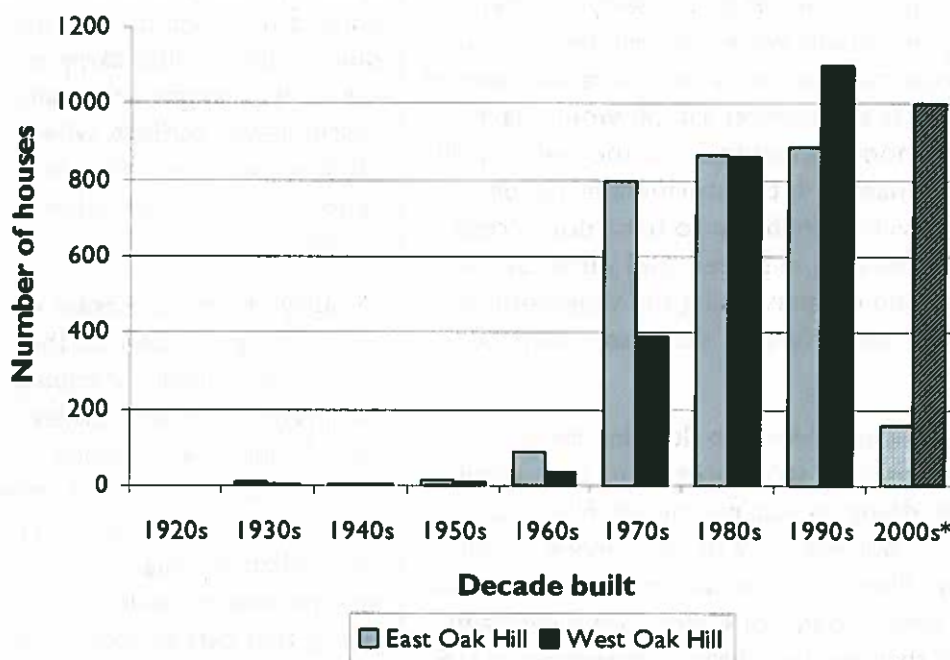
velopment patterns began to shift dramatically. The State of Texas and the City of Austin approved the construction of small private wastewater treatment plants. These plants were designed to collect sewage from homes in new subdivisions and to eventually become part of the City of Austin's central wastewater system. These treatment plants facilitated the construction of relatively dense residential subdivisions in the 1970s. The sudden boom in housing in the 1970s (Figure 5-7) reflects this.

The Austin Water Utility had plans to build major interceptors to eventually connect to these private wastewater treatment plants; major sewer main extensions were part of the City's capital improvement plans. In the mid to late 1970s, voters rejected bonds that would have funded the extension of wastewater lines into the Barton Springs Zone because of environmental concerns. In many cases, however, developers paid for pipeline extensions themselves. When the private wastewater treatment plants for Travis Country and Scenic Brook subdivisions began to function poorly, TCEQ required the Austin Water Utility to take over sewage collection services and retire the private plants.

The Austin Water Utility and the Lower Colorado River Authority (LCRA) now provide water and wastewater service to many homeowners who once used Trinity well water. These homeowners softened their hard well water with salt, which then damaged their septic tank systems. The homeowners successfully lobbied for access to a surface water supply.

Centralized wastewater service has also been established through the creation of Municipal

**Figure 5-7: Age of single-family homes in East & West Oak Hill**



\* 2000s data is for 2000 – 2006.



Utility Districts (MUDs). In the 1980s, continued private development led to multiple State-approved MUDs. MUDs are often approved in association with land use plans and are authorized to provide services, including water and wastewater, within their boundaries. For example, the Circle C MUD was approved in 1984 in conjunction with a land use plan for 1,200 acres. MUDs led to the construction of major sewer mains in the Williamson and Slaughter Creek drainage basins.

Austin Water Utility's service area has been expanded over time by various mechanisms and has been influenced by evolving state and local laws, bond elections, and projects developed out of compliance with current watershed regulations through grandfathered status (see Chapter 4). Although certain SER decisions are now reviewed by the City's Environmental Board, major sewer mains constructed in the 1980s generally provided capacity for dense development in the Oak Hill area.

### **RUNOFF, CREEK EROSION, AND FLOODING**

Current land development and watershed regulations require developers to address runoff on a site-by-site basis. Until 1974, buildings and roads were constructed without any structural controls to mitigate runoff; there was limited knowledge of the effects stormwater runoff would have on downstream neighborhoods. In addition to the water quality impacts discussed in Chapter 4, the stormwater runoff created by impervious cover contributes to hazardous creek erosion and localized flooding in streets and yards. Streams and creeks get wider and deeper, losing the vegetation that lives along their banks, which further increases the pace of erosion.

Areas of Oak Hill have been prone to flooding for years. Some flooding is the result of structures being built within the floodplain before doing so was restricted. Floodplains are land areas that are normally dry but are prone to periodic natural flooding. They are generally low-lying areas adjacent to creeks or other bodies of water. Some residents remember the flood that inundated the intersection of U.S. Highway 290 and William Cannon Drive in the early 1990s.

#### **What happens to runoff?**

When rain falls on soil, some evaporates, some is absorbed by plants, some recharges groundwater supplies like aquifers. When rain falls on surfaces that cannot absorb it (impervious surfaces), it becomes stormwater runoff.

Runoff should never become part of a municipal sewer system (sanitary sewer) because these systems are not built for large quantities of water. Infiltration of runoff into sanitary sewer systems can cause sewage leaks which pose major hazards to human health and the environment. Instead, runoff is channeled into creeks and lakes or into manmade storm drain systems. Manmade systems include ditches, street gutters that feed underground pipes, culverts that carry water under bridges, and finally storm sewer outfalls, where pipelines release their contents into creeks or other bodies of water.

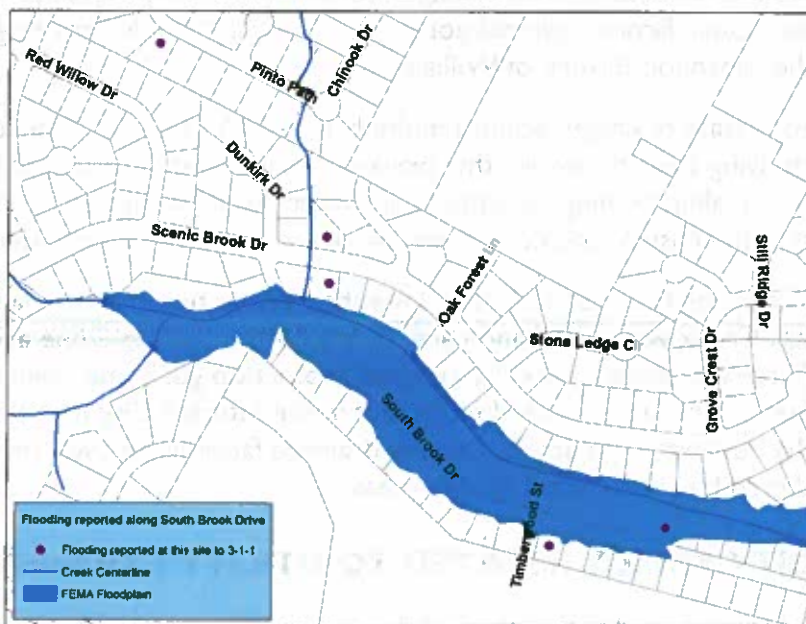
Drainage basins are areas of land that send water to the same river, creek, or tributary. Drainage basins are divided into drainage areas based on the natural branching of creeks or by the construction of concrete channels that carry stormwater or underground piping that carries stormwater.





Localized flooding also occurs because of high levels of impervious cover that are not adequately mitigated. Many of the residential subdivisions in Oak Hill were built without structural controls that limit the amount of stormwater runoff created by roads and homes. In Oak Hill, flooding reported on South Brook Drive (see Figure 5-8) may be caused by a combination of factors: steep slopes to the south of the property send water north toward homes, homes are built in the Williamson Creek floodplain, and the subdivision is older and may not have been designed under current regulations that require stormwater detention and drainage plans.

**Figure 5-8: Flooding Reports**



### City of Austin Programs

Runoff is mitigated for new construction on a site-by-site basis. Each proposed development must go through a development review process; water quality and flood detention controls or alternatives are required by the Land Development Code and related criteria manuals. Private developers hire licensed engineers to apply City regulations to their particular site. City codes state that new development cannot exacerbate flooding conditions within the city; all runoff from new development must be managed.

In many watershed areas, developers can choose between providing storage facilities for stormwater on their own property or contributing a 'fee in lieu' toward the City's Regional Stormwater Management Program (RSMP). The RSMP was created in 1984 and allows developers to save the expense of constructing and maintaining their own detention facility. The RSMP uses a watershed-level approach to plan for flood control. Staff design and choose appropriate locations for regional detention facilities, such as the Oak Hill Regional Stormwater Detention Facility.



**Figure 5-9: Erosion along Williamson Creek**

[http://www.ci.austin.tx.us/watershed/erosion\\_pbwilliamson.htm](http://www.ci.austin.tx.us/watershed/erosion_pbwilliamson.htm)



## Chapter 5: PUBLIC UTILITIES AND DEVELOPMENT PATTERNS

The RSMP also builds retention facilities, enlarges and channelizes waterways, improves conveyance structures, and manages voluntary property buyouts. In Oak Hill, the City maintains the Scenic Brook regional pond and the Dick Nichols Park Regional Pond, which is built into the Kincheon Branch of Williamson Creek.

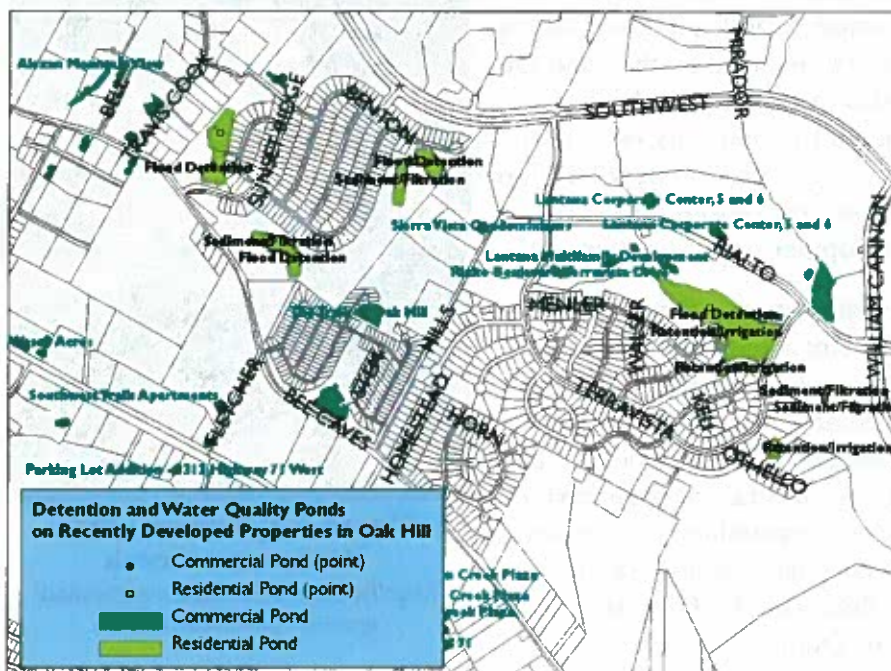
As private drainage facilities multiply (Figure 5-10), many municipalities, including Austin, are studying ways to ensure that privately maintained drainage facilities continue to function properly. Malfunctioning detention and water quality structures contribute to localized flooding, stream erosion, and contamination of surface and groundwater.

According to Phase I of the Watershed Protection Master Plan (see Chapter 4), the Williamson Creek watershed and parts of the Barton Springs Zone are high priority areas for Austin. These are areas where "watershed protection goals and objectives are not currently being met or are not expected to be met in the future." City hydrologists and engineers are studying the best ways to retrofit existing drainage facilities and will recommend what kinds of facilities should be constructed in new areas.

### CITY POLICY RELATED TO UTILITY EXPANSION

Factors beyond the control of the Austin Water Utility have affected the extension of water and wastewater services into the Oak Hill area. The Austin Water Utility's service area currently encompasses significant acreage within the Drinking Water Protection Zone despite City policy which restricted the provision of wastewater services in the Barton Creek water-

**Figure 5-10: Detention and Water Quality Ponds on Recently Developed Properties in Oak Hill**







## Chapter 5: PUBLIC UTILITIES AND DEVELOPMENT PATTERNS

shed (Sector 11 Land Use Plan, City of Austin Planning Department, November 1988, p. 20).

Other infrastructure planning in Austin requires environmental impact analyses. In 2001, City Council adopted an update to the 2025 Austin Metropolitan Area Transportation Plan (AMATP), which included “Additional Criteria for Construction of Roadways in the Drinking Water Protection Zone” to affect all future bond expenditures. The criteria state

Unless the road is authorized by an election of the City of Austin or another jurisdiction and the spending is approved by the Austin City Council, the bond proceeds will not be used to fund matches for road infrastructure of right-of-way through:

- The Drinking Water Protection Zone.
- A City of Austin preserve.
- A City of Austin destination park

*City of Austin 2025 AMATP, adopted June 7, 2001, last amended May 23, 2002.*



**Figure 5-11: Oak Hill Regional Pond**

City Council required that an environmental suitability analysis be conducted to determine how the construction of new roads would affect the Drinking Water Protection Zone. The Environmental Suitability Matrix considers whether a roadway is located in an aquifer recharge or contributing zone and whether any of the following are nearby: karst features, parks, water quality protection lands, greenbelts, or endangered species. For roadway projects that were ranked in the third and fourth quartiles of the matrix (having significant impacts), AMATP support staff recommended that they “should be evaluated in a special study during the long-range planning process, prior to design or construction, with specific attention to the mitigation of water quality impacts to the Edwards Aquifer.” Please see Appendix B for further information on the Environmental Suitability Matrix.

## CONCLUSIONS

Centralized infrastructure continues to allow for greater density in Oak Hill, such as new commercial and residential projects like Freescale, Advanced Micro Devices, Travis Country West, and various luxury condominium complexes. Although the capacity for potable water and central sewer service no longer poses a barrier to further development, the environmental consequences of continued development and related utility infrastructure construction still need to be considered as requests for development arise. Regional goals to maintain water quality also will need to be a part of this consideration.



**Figure 5-12: Types of Detention Ponds**



Sedimentation/sand filtration treatment was required in the Barton Springs Zone prior to the SOS Ordinance. These systems remove certain pollutants from storm-water runoff before discharging to a storm sewer or creek.



Retention irrigation systems retain runoff and distribute it through irrigation, meeting the non-degradation standard of the SOS Ordinance by allowing stormwater to infiltrate through the soil.



Wet ponds filter and detain stormwater runoff, provide habitat for wildlife, and offer aesthetic value. They achieve a level of water quality treatment equivalent to that of a sedimentation/sand filtration pond.